THE SCOPE

Blessed is he who taketh himself seriously, for he shall create much amusement. — *Anon*

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THE SCOPE

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THE SCOPE

Presents

Clinical Orthoptic Procedure

by William Smith, Opt. D., Boston, Mass.

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It has been said repeatedly, and by many who should know better, that it is impossible to develop one practical and uniform procedure for the training of all types of strabismus cases by means of orthoptics. That there is no foundation to this assertion is definitely proven by those orthoptists who depend upon skill, experience and actual knowledge for their results, rather than on gadgets and luck.

There is one fundamentally basic procedure for the training of strabismus by orthoptics. If we are to draw an analogy, we may compare this basic procedure in orthoptics to the basic procedure in refraction. Such a procedure in orthoptics, as in refraction, first of all, depends upon definite scientific principles. In both, optics, physiology, and psychology, play important parts. In orthoptics, we must add anatomy and pathology of the ocular muscles, their neurology and the various phases of psychology that have direct bearing upon the study of conditioned behaviorism. Thus attention, association, memory, fixation, recollection, and all the other attributes of perception, are vitally important to the orthoptist. They form the basis for the training which one must have before being able to treat orthoptic cases. In addition, clinical experience is invaluable, for in no other way, can the necessary practical experience be acquired. In ocular refraction, a definite routine is usually followed. Some use a routine consisting of 21 steps; others use routines somewhat different, but the basic outline of any routine is generally the same. It consists of sequences by means of which the various ocular functions are determined. The examination routine is the same, whether the patient has hyperopia, myopia, or astigmatism.

The primary basic orthoptic routine, likewise can be uniform for all types of muscle debilities. The essential variations consist of the prescribed mode of treatment, in the secondary phase of the treatment — the specific phase — much the same as are the prescribed variations between hyperopia and myopia, or astigmatisms.

There is but one type of fundamental corrective procedure in orthoptics with three specific procedures. Let me make this clear. Supposing we have a case of convergent strabismus, or esophoria. There is quite a variation between the two conditions, yet, both are very similar. Strabismus, in reality, is a manifest phoria. In this type of case, the inhibiting force is lacking, causing the weaker muscles to be forced out of alignment. In a phoria, there appears to be rivalry, but never complete inhibition. From the orthoptist's point of view, both conditions require the same mode of treatment. Phorias do not require as complete a program for training as do tropias, but the primary basic principles are the same. The same holds true of divergent conditions. Whether it is a phoria or a tropia does not matter so much. The program for training is essentially and basically the same in either case. The orthoptist who is seeking

a singularly different procedure for each case is seeking the non-existent.

If we are to analyze a case of muscular debility and then carefully determine the shortcomings that we are called upon to correct, we would, by careful analysis and deduction, arrive at a method for correction. Let us analyze such a hypothetical case and discuss the corrective procedures indicated. Assuming the case is one of left convergent strabismus with ambloyopia. Vision in the right eye is 20/20: in the left, it is 10/200—. The patient has normal retinal correspondence, by the After-Image and other tests. There is no apparent evidence of Aniseikonia. The fundi, fields, pupils, media, are normal. The refractive correction is negligible. Lenses do not improve vision in the left eye beyond 20/200. The Maddox tangent cross and the perimeter both indicate a 35 degree turn. The indicated method of treatment, therefore, is as follows:

1. Establish visual orientation.
2. Create sensitivity in the affected retina.
3. Teach macular fixation.
4. Teach projection.
5. Correct the amblyopia for near and distance.
6. Establish monocular and binocular perception and fixation.
7. Tend to develop diplopia (Superimposition training).
8. Start co-ordination training.
9. Fusion training (Base-in indicated).
10. Duction training.
11. Stereopsis training.

Each step in foregoing outline has a definite part in the re-conditioning of the acquired faulty visual habits as are evidenced in this case. Those doing strabismus orthoptics know that in cases of low visual acuity, due to amblyopia, the patient very often is lacking simple visual orientation. Oftentimes he is not able to determine the form or outline of objects seen with the amblyopic eye. This should be trained before any other training is started. The retina should be sensitized and made ready to receive stimulations. The macular area must be rehabilitated. It seems that the only element to which the optic nerve fibres respond is light. It is therefore light, either in simple form, or in the form of reflected images that must serve as the medium for stimulation. Projection training is indicated because the amblyope, especially with strabismus, invariably has faulty projection. Erroneously, some call it "false macula", but the objective and subjective manifestation consist of faulty projection nevertheless. This must be trained. Vision should be raised to as high a level as possible. Although normal binocular co-ordination does not depend entirely upon visual acuity, it is best to raise vision to the highest possible level, thereby giving the patient a better chance for developing normal binocular coordination habits. The stereopsis level does depend on visual acuity.

It seems that the training of any case by orthoptics depends a great deal upon the conditions discovered during the preliminary examination and upon the effect that the orthoptist desires to produce. Many orthoptists consider it training a case of strabismus merely by giving fusion exercises. They seem to pay no attention to the simple fact which is so obvious, that before fusion can be trained, there are other undeveloped elementary visual functions requiring attention. Perhaps this is due to the fact that many orthoptists still consider the macula merely as a patch or a spot on the retina and nothing more. As a matter of definite fact, the macular bundle is a separate bundle of fibres which extends the entire length of the optic nerve, with some of the fibres decussating at the chiasm as do other optic nerve fibres. Therefore, if there is low vision with faulty projection, extra-macular fixation, and all the anomalies observed in amblyopia exanopsia, it is not merely a defect in the retina and of the macular area, but throughout this entire bundle of fibres and beyond. Training must, therefore, be directed to eliminate macular

amblyopia and to establish a clear route of conduction of the visual images. Hence, it is advisable to spend as much time as possible in an effort to eliminate any visual deficiencies prior to training coordination. This accounts for the reason why the greater effort is directed in giving the patient a sound foundation before starting on the secondary training procedures.

Now let us consider another hypothetical case. One of exotropia. The patient, 25 years of age, has divergent strabismus of about 35 degrees on the Maddox Tangent scale and on the perimeter. The exotropia has been apparent since infancy and came as a result of some febrile disease. The patient is wearing correction which does not seem to improve vision in the affected eye. Vision in the good eye is 20/20 with glasses; the poor eye can barely count fingers at one foot away. There seems to be no indication of fundus pathology. The patient has normal retinal correspondence (After-Image test). His near point of vision is J .50 type with the good eye, and only large newspaper headline type at about 6 inches with the left eye. Using the Peckham flashing device, it was estimated that the amblyopic eye may be developed to about 20/100 or 20/70 vision (maximum) by training.

As in the first case cited, the same problems were apparent. Essentially, both cases are very much alike, excepting that in one case the eye turns in, whereas in the other one, it turned out. The first part of the program, at least, could be similar to that used in the first casse. Therefore, the program outlined consists of the following steps:

1. Establish visual orientation.
2. Create sensitivity in the affected retina.
3. Teach macular fixation.
4. Teach projection.
5. Correct the amblyopia for near and distance.
6. Determine and correct accommodation anomalies.
7. Establish monocular and binocular perception to a point of diplopia (fixation).
8. Start co-ordination training. (Start with superimposition training).
9. Fussion training (Base-out indicated).
10. Duction training; accommodation training.
11. Stereopsis training.

In this type of case, two added steps in the training procedure may be noticed. In exophorias as in exotropias, there is an underdevelopment of the convergence faculty and with it invariably, the accommodation is frequently sub-normal. It is imperative in many cases to give accommodation training separately, even before convergence and duction training is started, in order to get the visual functions prepared for the normal tasks confronting them. This however, is not an ironclad rule, especially in exophorias. Determination of the cause usually indicates the mode of treatment procedure. If the exophoria is of the exhaustive type. it would hardly do to give accommodation training. In such cases accommodation should be relaxed.

The early part of the training program. is the same in both exotropia and esotropia. The essential part of the program is the elimination of the amblyopia and all its manifestations. Base-OUT is the specific training procedure in exotropia and exophoria, inasmuch as this type off training tends to develop a convergence amplitude. Oftentimes it may be necessary to start the fusion training by using Base-IN effect prior to starting on Base-OUT. The patient's easiest point of superimposition is the deciding factor on how to commence. But whatever the starting point may be, orthophoria, and after that a high degree of convergence in exotropia (and divergence in esotropia) is the desired result. It is recognized that a constant amplitude ration of 3::1, or

4::1, is sufficient in divergent strabismus. A 3::1 ratio is ample in esotropia.

In older patients, such as the one cited in the hypothetical case, the results are more difficult to obtain. Longer training time is required and the periods of treatments must be shorter because of many disturbing factors, moreover, each step in the training procedure, especially those for the elimination of amblyopia and the training of visual acuity, require more time and greater effort. In younger persons, especially children, the reactions are more rapid, and the progress much more gratifying for the length of time spent in training. Whether the case is that of esotropia and exotropia and regardless of the patient's age, the early part of the training procedure calls for great diligence and concentrated effort. Maximum attainment must be made in the first six steps of the training procedure before starting on the second or binocular co-ordination part of the program.

While the esotrophias and the exotropias constitute the more common muscular anomalies, there are frequently encountered compound muscular defects, cases in which horizontal defects are complicated with vertical phorias or tropias. Treating anomalies of this type present real problams to the orthoptist, inasmuch as there are present two distinct anomalies, with possibly two distinct causes.

As in the earlier two hypothetical cases, the elementary training procedure in compound anomalies is no different. The same training of the elementary visual habits must be given. The variation commences with co-ordination training. As soon as the patient is ready to receive monocular and binocular fixation training, an additional step for the vertical alignment of the two images must be instituted. It may be necessary to employ vertical prisms to accomplish this, or this may be accomplished by other means. The importance, however, is that vertical training should be instituted as soon as it is possible. As the patient's monocular and binocular fixation habits become developed and he is ready for superimposition training, care must be taken to create normal superimposition, both vertically and horizontally. Another hypothetical case is really not necessary to illustrate such a method of procedure. To either one of the two cases cited may be given additional ano- have to be rearranged so that it would include have to be rearranged so that it would include treatment for this defect at the same time that the horizontal imbalance is being treated. The program would then be:

1. Establish visual orientation.
2. Create sensitivity in the affected retinal fibres.
3. Teach macular fixation.
4. Teach projection.
5. Correct the amblyopia for near and distance.
6. Establish monocular and binocular fixation.
7. Teach superimposition, vertical and horizontal.
8. Versions and rotations, with emphasis on vertical.
9. Co-ordination and fusion training — training — vertical and horizontal.
10. Duction training, vertical and horizontal.
11. Stereopsis training.

Simple hypertropias altough rare, require precisely the same program of training. A vertical imbalance usually has some form of horizontal complication, or it may be indirectly the result of one. Besides, it is hardly possible to train vertical muscles independently of the horizontal. It is likewise impossible to send a motor impulse to one eye only, or a stronger innervation to one eye than to the other. This is a simple neuro-physiology and we needn't go into that at this time.

Difficulty arises when orthoptic training is attempted in true alternating strabismus. While the program pursued in these types of cases is similar to that for concomitant strabismus,

there are numerous variations to those techniques because of the manifestations which are observed. First of all there is no amblyopia problem, yet there is definite alternating suppression. There is no fixation and procetion problem, yet binocularly these functions are abnormally developed. There is definitely faulty version and rotation faculty. Diplopia is difficult in being induced. It may be impossible to induce superimposition even with high-power prisms. There is usually anomalous retinal correspondence, which may persist in spite of training, indicating among other things, possible Aniseikonia. There is definite aversion to fusion and there is rapid alternation. With all these factors apparent, the problem of devising a proper procedure for training is no sinecure. In my experience with true alternators, the following program seems to be productive of greatest results. It is imperative to make differential diagnosis between true and false alternating strabismus before venturing upon treatment regardles of type.

1. Light stimulation using two retinal flashers of varying speeds. (Color filters may also be used.)
2. Monocular and binocular fixation training over the entire field of fixation, starting at the approximate angle of deviation, toward orthophoria and beyond.
3. Simultaneous binocular fixation training. (Same procedure as in 2.)
4. Superimposition training. (Same procedure as in 2.)
5. Version and rotation training, manually at first.
6. Equalization of binocular perception.
7. General calisthenics, using prisms to produce diplopia. (No specific base-apex location at first.)
8. Fusion training.
9. Duction training.
10. Elimination of alternating suppression training, and development of tolerance amplitude.
11. Stereopsis training.

As may be noticed, the procedure in alternating strabismus contains nearly the same routine with minor variations as do the routines outlined for the other types of strabismus. Although there is no visual acuity problem to contend with, and although the fixation and proection problems are absent, there is, nevertheless, the rapid alternation and the problem of aversion to binocular fixation and to fusion. It appears, when superimposition is attempted, that the right-side image jumps across to the left and vice versa. [1] The rapid alternation is involuntary and the patient is not aware of its existence until superimposition is attempted. Simultaneous flashing of the two eyes and monocular, binocular and simultaneous binocular fixation, tend to resensitize the areas of insensitivity. A new path of conduction may thus be established by which the images may be carried across the visual reflex arc without lapsing. Monocular, binocular, and simultaneous binocular fiaxation training tends further to stimulate the non-sensitive areas and to intensify the conductivity of the visual images until this function becomes fixed and habitual. Superimposition training is the first step in the co-ordination routine. Version and rotation training tends to develop the refractory ocular muscles and to establish an easy flow of innervation. Equalization of binocular perception tends to create easy simultaneous binocular vision. Calisthenics is a much indicated procedure in alternating strabismus training because of the need for innervation to the refractory ocular muscles. It is very often necessary to give prisms for constant use in an effort to create diplopia. Before fusion training is started, it is necessary to eliminate any vestige of existing suppression, and for this purpose, training to eliminate alternating suppression must be given. The remainder of the program is as in concomitant strabismus. When prisms are prescribed either for constant

[1] (*Javal and Bielschowsky described this phenonmenon as horror fusionalis.*)

use or for training, the purposes for which they are being given must be well considered. A rule to follow is that the apex of the prism be placed in the direction of the desired turn. Strong vertical prisms are often very useful in creating and maintaining diplopia. It is advisable to change their powers and base-apex position before the eye at frequent intervals.

The routine in phoria training is very much the same as in tropias excepting that the program need not be so complete. In phoria training, we are mainly concerned with re-establishing proper innervational habits. Base-in training tends to stimulate divergence and to create a relaxation of the convergence muscles. Base-out stimulates the convergence muscles and develops that faculty. In phorias, the various diagnostic findings indicate the procedure, but essentially, these procedures are very much alike. Whatever variations there may be, are in the supplementary training techniques which are necessary in order to develop the co-related functions. For example, not in all cases of exophoria is base-out training indicated. Some cases call for base-in training with relaxation or stimulation of the accommodation as the case may be. Likewise, not all cases of esophoria, require base-in training only. Strabismus orthoptics, definitely the most difficult part of orthoptics, appears to offer greatest possibilities. This is undoubtedly due to the rational procedures and the corrective techniques.

As can be readily seen, the methods and techniques outlined are based upon established factors in the psychology of visual perception. The entire routine follows very closely the natural development of normal visual functions and visual habit. Throughout the procedure one factor, essential to the development of habit is stressed — that of repetition. The techniques outlined are based entirely upon the supposition that the visual functions leading to the development of normal visual perception have not been properly learned. Improper visual perception habits have been develeoped instead at the time when normal habits are normally developed. Habit, we are told, is acquired by constant repetition. It is also known that it is possible to change habits by substituting and learning new ones. Hence, repetition of the various training procedures, until each step becomes fixed thoroughly, is of utmost importance.

I refrained from mentioning instrumentation because I feel, as do many others, that it is the technique and the thoroughness with which a case is understood and handled and the persistence with which the various steps are carried out, that is responsible for the successful outcome. It is contended that proper instruments are essential. However, the faith that some men place in gadgets and the expectation and belief that instruments alone can replace knowledge and experience in orthoptics is amazing. The procedures outlined can be used with any type of instrument, whether they are an ordinary stereoscope, a phoropter, or some of the more costly pieces of apparatus or those constructed in the woodshed. Essentially, all orthoptic instruments are based on the principle of stereoscopy. It doesn't really matter what the instrument is, because once a normal foundation is partly or fully established, the remainder of the procedure is rather simple and only depends upon time for its fulfilment. The time element is an important factor in orthoptics. Clinical experience taught me not to hurry a case. Each step should be fully developed until it has reached its maximum point in ease of attainment, before another step is commenced. The same is repeated until the very end of the program.

A practical uniform technique in orthoptics is possible, and can be applied to the majority of cases. There are, to be sure, exceptional cases in which the prescribed routine cannot be applied successfully. In such cases, the ingenuity of the orthoptist must come to the fore. But such cases are rare and are rather the exception. Post-operative cases require special investigation and very often call for special programs. Cases of optical nystagmus, concerning which there is hardly any literature, seem to respond rather well to combined orthoptic and refractive treatment. There are other

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Thru the Editor's Eyes

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Editorial

North End Survey

When we seniors started our respective three-week clinic assignment we found that we were confronted with a new outside assignment. The location of this survey was at the North End Union House at 20 Parmenter Street, in the North End section of Boston. The assignments were held on Monday nights and Wednesday mornings.

The Wednesday morning assignments were much the same as our other outside surveys in that we examined only children of school age.

When it came to the Monday night assignments we found that we had a new situation. We were now faced with the problem of examining large groups of adults, most of whom could neither understand or speak English. We were aided by a few of the young boys at the community house, in the role of interpreters; but, even with their assistance it was difficult at times to convey to the patients exactly what we wanted of them.

Any of the students who were fortunate enough to be assigned to this survey can give some interesting accounts of their experiences; for no matter how objective the test that they were performing might be, there were always the regular instructions to be given to the patient.

This survey has been concluded now, but will be resumed in the fall. At that time probably more members of the class will have the opportunity of examining at the North End Union survey.

Incidentally, for the students who felt that it was difficult to work with interpreters, it has been mentioned that in the fall there will be a new survey conducted at an institution for deafmutes.

--Orthoptic Procedure

(Continued from page eight)

types of cases for which orthoptic training is given promiscuously. If these cases fail to respond, it is not because of faulty technique or inadequate instrumentation, but because orthoptics was not indicated in the first place. I saw a case recently in which base-out training was being given to a woman of 32. The more training she was getting, the more divergent her eyes were becoming. When I saw the case, it had already developed into an exotropia in place of the original exophoria.

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The Measurement of Stereopsis

by Put. B. E. Vodnoy, Opt.

Reprinted from THE OPTOMETRIC WEEKLY

(Continued from last issue)

VII. *Etiology of Defective Depth Perception*

a. *Occurance of defective perception* — Ninety-one and one-half percent of persons who are free from nervous, ocular and general defects exhibit a persistent parallactic angle average 10.3 seconds or less; that is, they will persistently project the adjustable rod an average of not more than 30 millimeters from zero. The remaining one-half percent of this class of individuals will project the adjustable rod more than 30 millimeters from zero for a large number of trials, but will eventually project it less than 30. Just why this occurs has not been definitely determined, but the cause seems to point to nervousness, poor comprehension, and particularly to carelessness in performing the test.

These men usually project the rod between 30 and 50 millimeters from zero. If they persist in this indefinitely they are considered as defective in judgment, but if they correct this error, after two or three series of trials, they are considered normal. Observation has taught us that these men experience no difficulty in flying, that is, insofar as judgment is concerned. Furthermore, practice on the testing apparatus will not reduce the average error when an ocular defect exists.

b. *Known factors operating for poor depth perception* —

(1) Inequality of vision.

(2) Refractive errors resulting in accumulative ocular fatigue and manifested by —

(a) Accomodative asthenopia.

(b) Heterophoria.

(c) Insufficiency of convergence.

With the exception of the small number mentioned above, all individuals who are inaccurate in their judgment of distances are found to have one or more of the above defects. These individuals will project the adjustable rod 75 millimeters from zero in one direction, in the next trial will project it 150 millimeters in the opposite direction, and in still another trial may place it at zero. In other words, they have no conception of the relative or actual positions of the rods.

However, it must be remembered that some individuals may have all the defects enumerated above with the exception of inequality of vision, and still possess a very accurate estimation of distances; but in general it may be stated that when any of the defects mentioned are severe enough to cause such symptoms as muscular fatigue, blurring of vision, diplopia, etc., judgment of distances is inaccurate and degree of inaccuracy is in proportion to the degree of symptoms manifested.

c. *Inequality of vision* — Given a case with a visual acuity of 20/20 in one eye and 20/50 in the other and assuming that there is no strain of accommodation in the defective eye, the defective judgment is due under these conditions to an inability to utilize fully the assistance afforded by physiological diplopia and binocular parallax. The cerebral interpretation of this diplopia into distances is partially lost because of the diminished vision; also, the impression of relief is not as marked as normal. Therefore the individual is utilizing monocular judgment in his estimation to a greater or less extent and the greater the reduction in vision the nearer will binocular approach monocular vision.

d. *Hyperopic refractive errors* — The existence of refractive errors creates a defect in the ocular mechanism and when accumulative fatigue ensues as a result of work, nervous strain, infection, etc., it is the existing defective structure that is first to become impaired in function.

When hyperopic refractive errors exist, the individual must at all times accommodate to bring far as well as near objects into focus. Therefore, in order to do this the ciliary

muscles must receive a greater amount of innervation than is required by a normal eye, and the increased amount is interpreted into distance by the cerebrum. Consequently the amount of nervous force employed gives rise to the sensation of a proportional amount of distance. Usually this apparent distance is less than that which actually exists.

When the refractive errors are unequal in the eyes and is fully compensated for by accommodation, the defective judgment resulting therefrom frequently can be corrected. The increase of nervous impulse required to correct the defect is equal in both eyes. If the object upon which the eyes fix appears nearer or at a greater distance than it really is, the other object or objects will be falsely projected in proportion, and the relation between the two will remain unchanged. This type of defect gives rise to faulty landings. The student will persistently level off too high or too low until he has learned to compensate for his error.

When the rafractive errors are unequal in the two eyes — for example, one-half of a diopter in one and one diopter in the other — the higher error will require the greater amount of nervous impulse to accommodate. The unequal nervous strain will alter the apparent relative position of objects, and defective and erratic judgment results.

e. *Accommodative asthenopia* — When accumulative ocular fatigue is present, there are usually errors in refraction responsible for it. As it is necessary to accommodate constantly for distant objects, the eyes become tired as a result of the nervous and physical strain, accommodation relaxes, and objects are seen out of focus. Because of the indistinct vision an accurate estimation of distance is impossible. This condition is particularly noticeable in some individuals who are undergoing flying training. One day they can judge distances very accurately and experience no difficulty in landing their ships, while on the following day they cannot level off and land consistently or accurately. These cases have latent hyperopic errors, and because of the mental and physical strain incident to training their accommodative powers become reduced and objects are not brought into focus. The wearing of correcting lenses usually improves the faulty judgment.

f. *Heterophoria* — Heterophoria may be considered as fatigue of one or more of the extrinsic ocular muscles dut to refractive errors, to a deficiency in the normal amount of enervation from some cause, or to an actual defect in the muscle structure itself. In order to fix both eyes upon an object the defective muscle must receive a greater amount of enervation than its fellows. This increased amount of enervation is interpreted into distance by the cerebrum just as it is in refractive errors; therefore the relative position of objects is inaccurately judged. If the defective muscles become sufficiently fatigued or the required amount of nervous impulse cannot be suspplied, the visual line of the eye concerned will deviate and objects will become blurred or pathological diplopia will ensue. When diplopia occurs all objects within the field of vision appear double, the true objects appearing more distinct than the false objects.

g. *Insufficiency of convergence* — Convergence must occur at all times in order to fix both eyes upon the object, no matter how remote, but the degrees of convergence required for distant objects are necessarily less than those for near objects. When the eyes become fatigued convergence relaxes and objects are blurred or pathological diplopia results. This condition is usually associated with refractive errors, as is the condition of heterophoria.

h. *Myopic refractive errors* — Myopic errors have little or no effect upon depth perception until the errors are sufficient to cause indistinct images and a strain upon convergence. When the errors are sufficient to cause these symptoms, depth perception becomes defective as in insufficiency of convergence and inequality of vision.

VIII. *Summary*

Accurate judgment of distances is important to the aviator because if this sense or function is impaired it is impossible for him to learn to fly an airplane safely unless he is given an

enormous amount of flying training. He may under these conditions become sufficiently proficient to fly with comparative safety, but he will never attain even an average degree of proficiency.

Inherent depth perception for objects located in infinity is dependent upon physiological diplopia and augmenting this diplopia are binocular parallax, size of the retinal image, and convergence. Physiological diplopia is interpreted into distance by the cerebrum and the binocular parallax gives rise to the impression of relief and solidity.

An adjunctive group of factors assist inherent depth perception. These factors are common to all persons; they are inconstant, but they play a very important part in accurate judgment.

The degree of accuracy of judgment is determined by the size of the binocular parallactic angle. The testing apparatus is so constructed that with an interpupillary distance of 64 millimeters, the stationary rod at 6 meters distance. and a depth difference between the stationary rod and the adjustable rod and the adjustable rod of 30 millimeters, the binocular parallactic angle thus formed subtends an angle of 10.3 seconds.

In determining the degree of accuracy in judging distances, only the basic group of factors is considered, because if these are not functioning properly the adjunctive factors cannot be utilized fully. An experienced flier who has been deprived of some of the basic factors may be able to fly a ship with reasonable safety because he has learned from his flying experience to utilize to a marked degree the adjunctive factors. However, he is not as safe or reliable as the normal person.

Ninety-nine and one-half percent of persons who are inaccurate in judgment have a defective ocular mechanism. These defects may be reduction of vision in one or both eyes or refractive errors resulting in ocular fatigue and manifested by accommodative asthenopia, heterophoria, or insufficiency of convergence.

A persistent parallactic angle of more than 10.3 seconds — that is, a depth difference of

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Survey Notes:

Those who have made surveys at the various centers have run across many trivia which are worthy of being recorded. Here are a few:

Presbyopic women who complain of difficulty seeing the blackboard at school, and have trouble writing their exercises. Quite a shock until you learn that they are attending Americanization classes.

The almost child-like pride of one of these as she produces a copy book and shows you the inscription, "My name is - - - - - - - - I live at - - - - - - - -," written in a hand reminiscent of the second grade.

The co-operative mother who, when her 10 year old son is shown the Ishihara colorplates, prompts, "You know, Victor, two more than ten."

The little girl who demanded glasses of each of the five examiners.

The examiner who instructed one patient to "change your eye".

Another attempting to determine the visual acuity of an artificial eye.

One of the "doctors" taking a quick lesson in Italian, in order that he might instruct patients to "follow the light" without the services of an interpreter.

A certain Senior wanting to stop and shop for home-made stogies at five-for-a-nickel.

One young lady (no names mentioned) cautioning her patients that it's "no fair peeking". Incidentally, half of them didn't know the meaning of "peeking".

The patient who saw "nothing" at the near-point of convergence.

Nothing if not frank, our colleague who informed Dr. Green that "I had a patient at the Crawford House last week . . . . "

The innumerable youngsters who, when asked if they see a bird in a cage, reply, "No, I see a parrot in a cage."

The shortest member of the Senior class (no names, please) holding an occluding-card before the eye of a six-foot-three gent while taking measurement of vision.

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Senior Segments

by Joe E. McDermott

The truly great thrills that come to one during a lifetime are comparatively few, and I believe that we all received one of our greatest the other month when we as Seniors started off one afternoon for M. O. C. By the time this article appears we will all be old hands at refraction, having had at least twenty thousand cases! Regardless how many refractions we may do in the future, we shall never forget the thrill of the first one. That first patient represented that which we have all strived for. and that profession which we shall devote the rest of our lives to.

We are going through our Senior year the hard way, no twelve weeks for review and sleep this summer. Ho-hum — who wanted a vacation anyway (I keep trying to tell myself, as I look at my golf bag out of the corner of my eye). A good proverb for study used to be: "Do the day's work within the day". This summer we might find this one more suitable: "Study your heads off the cool days, for tomorrow it may be as hot as - - - -. Yes, it does get hot in Boston doesn't it?

Congratulations are in order for Dr. John E. Asarkoff for his excellent article "Histologic Observations of the Angle of the Anterior Chamber in Glaucoma" which appeared in the May issue of *The American Journal of Optometry* and *Archives of American Academy of Optometry.*

"Art Imitates Nature" and "Necessity is the Mother of Invention", so said someone by the name of Richard Frank in 1658, and to Clinton Wilson this was more than a proverb. Clinton realized the difficulty in measuring the vision at near in children who were too young to read the standard Snellen Near Card. He combined his knowledge of optics and photography to produce splendid Illerate E Charts for Near, and the entire Senior Class is grateful.

S. Ishihara as we all know, has been traveling on surveys for a long time. However, recently "Ishie" underwent a surgical operation. You can still see the adhesive tape in place and we all hope he will be completely recovered (or rather rebound) soon!

I still like that famous crack that came up in Practical Optics, for those who have difficulty in closing one eye while taking pupillary distance measurements. Don't say "Look at my open eye" tell the patient, "Look at the least distorted side of my face."

After many hours of study and the use of involved mathematical formulae, C. Poulos has finally installed a light over the blackboard which will toss off just the right amount of lumens at the proper angle of incidence. Oh yes, I might add that no one in the room can see a thing on the board unless he stands on his head!

We have a Job to do!

We who serve the eyes of America have an important job ahead of us.

Good vision is one of our most vital resources . . . . to that task we dedicate ourselves.

To the very limits of our abilities we shall render the most efficient service possible under war conditions.

We shall maintain our standards of quality.

To all of this we are pledged . . . . so that the Refractionists of America may be better able to do their job in bringing better vision to the millions of Americans who are fighting for us in the factories, offices, and on the farms . . . . and on the far-flung battlefields of the world.

— *Courtesy of* SOFTLITE LENS COMPANY

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Junior Jolts

by Veaner and Lippin

By the time this issue of the well-known SCOPE reaches your feeble foveas, dear people, each one of us will have had a brief but welcome rest and vacation. Well, as Ceasasr said, "Magna cum drek omina plures et unum!" English translation — "Nerts". Which we heartily endorse as the correct and suitable expression to be used during G. O. periods, especially on Monday mornings, after a Sunday night.

We are very happy to continue our platonic relationships with our fellow classmates, who have been reprieved, we mean deferred because of studies. Among those who continue on, by courtesy of the U. S. Army, are John Collins, Luther Bickmore and "Nellie" Waldman. Johnny Collins awaits duty with the U. S. Army Air Force as a Communications Officer. Luther Bickmore was deferred long enough to finish his Junior year, he hopes. Waldman hopes to get his commission as a flying gentleman in one of Uncle Sam's big birds, although they could commission Waldman as a B-19 Bomber and he could fly over Tokyo and drop thick convex lenses. Till the Army does get "Nellie" though, Waldman can still be heard from the "third" row repeating the last phrases of Dr. Svendsen's lectures.

That the embryologic optometric specimens of this class have matured into adroit Refractive Wraiths can be well-proven by the person foolish enough to be refracted by a Junior. It is a sure way to commit suicide. Has anyone ever noticed the wild look that enters Steinberg's eye as he claws at a keratometer? And Reardon, with a double barrelled retinoscope, the light gleaming in his eye. Pupil reflex, no doubt! Danger lurks with Junior Jerks.

Although Dr. Green will probably doubt and Duke-Elder turn over in his grave at the oddity discovered among us, we have a man who defies the laws of Physiology. It has been claimed that it is impossible to dilate or contract the pupil at will but Arnold Buonfiglio stands ready to defend the argument against the argument. Do we make ourselves muddy! In other words, Arnold can dilate his pupils and contract them at command. We know this is "against the rule" but we are sure Redslob won't mind.

We thought we'd seen everything (after all the O. H. is still open) but we would liked to have seen Cowan practising retinoscopy on his dog, a Dachshund. Some people will go to any lengths!

Of all things, Eddie Whelan's brother playing for Biddeford High School, broke a deadlock by slamming a 9th inning doube to beat Lionel Dubois's alma mater, St. Louis High School.

Oh yes, by the way — Class elections were held and they were so boring, in fact, the voting was done in a quiet peaceful manner; of course bats and rocks didn't help restore this pleasant silence. Finally the results were tabulated and the winners in the third were:

President: Nelson "Franklyn" Waldman
Vice-President: Robert Lee Lippin
Secretary: Amelia Caton
Treasurer: Arnold Buonfiglio

And so as a new year begins with a new set of Class Officers, we heartily wish them success and boy they'll need it. Amen!

II (*lemon*) *Now!*

Survey Notes

(Continued from page twelve)

Ophthalmoscopy on garlic-eating patients.

Remember Angie, boys?

Three surveyors — two patients.

The patient who persisted in reversing the direction of the illiterate E.

The glaucomatous gent who received a position at the Watertown Arsenal.

And remember the good old days, when they used to serve us lunches after the surveys?

Soph-Boiled Yeggs

by Irving Greenblatt

As far as we sophomores are concerned this six weeks vacation is a handy thing. But, strictly speaking, you'll learn later on, that that isn't so, due to other things entering in. In fact we're not sure of anything due to other things entering in later on.

Take for instance this typical Practical Optics question:

Give Rx and data: an 83 year old Hottentot who uses a size 21 cue-stick holds a camels-hair lens 23 feet from a lens held by cross-eyed Ubangi who bats .427. Hint: Don't be fooled because 23 goes into 46 evenly.

A half-crazed hysterical voice in the rear shouts: "Eet is impossible, eet is a farce." Take it easy Otto.

Your Sophomore editor feels that it is his patriotic duty to inform the Miami Draft Board No. 48, that one "Moishe" MacCarthy formerly of Miami and erstwhile draft dodger who claims exemption on the grounds that he has a heart murmur is perfectly normal. In fact "Moishe" MacCarthy is now known as "Lubb Dubb" Epstein.

This month's "Personality of the Month" brings you Edward Victor, Professor of Chemistry at the Boston School of Pharmacy.

Dr. Victor is a Boston boy who got his education at Boston Latin School, Harvard and Boston University. He holds degrees of Master of Arts, Bachelor of Arts, and Master of Education.

For one year he taught Science and English in Puerto Rico, where he was also head of the track team and Boy Scout leader. This puts him in shape for teaching M. S. O. boys, having already handled illiterates, having learned to run fast, and having done his good deed each day.

When duty calls he intends to enter the Chemical Warfare Branch of the Army, since he has taken courses and has a good knowledge of this subject.

Concerning M. S. O. boys, he says, "I have nothing to say."

Next month your editor will interview General Douglas MacArthur.

"I've lost another pupil," said the professor as his glass eye fell out and broke.

Vacation time is upon us and for six weeks we can rest our overworked brain (?) and come back filled with energy and spirit.

There is nothing like sunshine to build you up — that is as far as you are concerned there's nothing like sunshine to build you up — you will learn later on that other factors enter in . . . .

Ah well, there's always Esther.

Have a pleasant vacation.

Greenblatt

-- Stereopsis

(Continued from page twelve)

more than 30 millimeters — is considered as defective provided an ocular defect is present.

Any hyperopic error in refraction may cause inaccurate judgment. Myopic errors have little effect upon judgment unless the error is sufficient to cause diminished acuity of vision and insufficiency of convergence.

If in the first series of trials the candidate makes an average error of over 30 millimeters for example, between 30 and 50 and no ocular or general physical defect can be found to account for it, it is advisable to re-check him every day for at least three days. Invariably these candidates will eventually attain an average error of 30 millimeters or less. Experience has taught us that these individuals experience no difficulty in flying insofar as judgment of distances is concerned.

-- Clinical Procedure

(Continued from page nine)

The patient, it appears, did not have the benefit of a thorough ophthalmoscopic examination, fields,, or a medical examination. The symptoms, both ocular and systemic, indicated a possible paresis. Injudicious prescription of orthoptics is harmful to all concerned. The orthoptist, before advising treatment should make every effort to determine whether such treatment is indicated. Orthoptics is not just another commodity which may be turned into dollars and cents by clever salesmanship, and by still more impressive looking apparatus.

What I am attempting to present here is simple clinical orthoptic procedure, applicable to all types of cases and to any type of apparatus at the practitioner's disposal.

Orthoptists want and need a practical, simple, workable procedure that may be used with the minimum equipment. Instruments are merely tools. A good workman can do a good job with the minimum of effort and with the simplest of tools. As already stated, the most essential requirement in the practice of orthoptics is knowledge and experience. It is the orthoptist who knows nothing about orthoptics that needs gadgets which will work for him, think for him and perform miracles in his name.

References:

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Dr. William Smith, 80 Boylston St., Boston, Mass.

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